

**MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL**

Paper Code : HSMC 701/HSMC701 Project Management and Entrepreneurship

UPID : 007559

Time Allotted : 3 Hours

Full Marks : 70

*The Figures in the margin indicate full marks.**Candidate are required to give their answers in their own words as far as practicable***Group-A (Very Short Answer Type Question)**1. Answer *any ten* of the following :

[1 x 10 = 10]

- (I) What is entrepreneurship?
- (II) What is convergent thinking?
- (III) What is role of incubation in entrepreneurship?
- (IV) Write the full form of SISl.
- (V) State any two roles of entrepreneur.
- (VI) What is Project Life Cycle?
- (VII) What is CPM?
- (VIII) If NPV > 1, the company _____ the proposal.
- (IX) What is design thinking?
- (X) Design driven innovation is a _____ approach .
- (XI) Define the term Project Management.
- (XII) Define Work breakdown structure.

Group-B (Short Answer Type Question)Answer *any three* of the following :

[5 x 3 = 15]

2. Briefly explain the steps in innovation management. [5]
3. Discuss the 5 phases of project life cycle with the help of a chart. [5]
4. Company C is planning to undertake a project requiring initial investment of \$105 million. The project is expected to generate \$25 million per year in net cash flows for 7 years. Calculate the payback period of the project. [5]
5. Discuss the importance of work breakdown structure. [5]
6. Difference between PERT and CPM. [5]

Group-C (Long Answer Type Question)Answer *any three* of the following :

[15 x 3 = 45]

7. Write a note about issues and problems in project management with examples. [15]
8. (a) What is a blue ocean strategy? [5]
(b) What are the 5 principles of design thinking. [5]
(c) Is design driven innovation a push or pull approach? -Explain. [5]
9. Discuss the qualities of a prospective entrepreneur. [15]
10. Discuss various types of funding options for an entrepreneur. [15]
11. (a) What is TRIZ? [10]
(b) Explain theory of McClelland in motivating entrepreneurs. [5]

*** END OF PAPER ***



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : OECAIDS701A/OECAIML701A Internet of Things

UPID : 007816

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :

[1 x 10 = 10]

(I) Which component is critical in enhancing the accuracy of smart sensors?

- a) Interface circuits
- b) External memory
- c) Power circuits
- d) Fiber optics

(II) Why is environmental parameter monitoring important for IoT systems?

- a) Reduces costs
- b) Improves data security
- c) Enhances real-time decision making
- d) Improves internet speed

(III) Resistive sensors are commonly used to measure:

- a) Pressure
- b) Temperature
- c) Humidity
- d) All of the above

(IV) Which of the following is a key characteristic of sensors?

- a) Sensitivity
- b) Cost
- c) Brand
- d) Color

(V) Surface Acoustic Wave (SAW) sensors are typically used for:

- a) Temperature measurement
- b) Gas detection
- c) Humidity sensing
- d) Pressure monitoring

(VI) Why is silicon technology commonly used in smart sensors?

- a) Cost effectiveness
- b) Low processing speed
- c) Scalability and flexibility
- d) Lack of alternatives

(VII) IoT-A stands for _____.

(VIII) What is the primary role of IoT in environmental monitoring?

- a) Increasing data storage
- b) Reducing environmental pollution
- c) Real-time data collection and analysis
- d) Enhancing sensor life

(IX) What is the primary function of pressure sensors?

- a) Measuring heat
- b) Detecting chemical concentration
- c) Measuring force exerted by a fluid
- d) Measuring air quality

(X) What does fractional-order element refer to in sensor design?

- a) Phase shift
- b) Constant phase impedance
- c) Sensor size

- d) Signal frequency
- (XI) The adoption of smart sensors is important because they:
- Are cheaper than traditional sensors
 - Provide real-time data with better accuracy
 - Have limited range
 - Are manually operated
- (XII) The sol-gel process is used in sensor fabrication for:
- Gas sensing
 - Vapor deposition
 - Electrode deposition
 - Film deposition

Group-B (Short Answer Type Question)

Answer *any three* of the following :

[5 x 3 = 15]

- Why is the measurement and monitoring of environmental parameters crucial in IoT applications? [5]
- Classify different types of sensors used in IoT applications. [5]
- Discuss the importance of smart sensors in modern IoT systems. [5]
- How is anodization used in smart sensor fabrication? [5]
- What are the emerging applications of smart sensors in healthcare and agriculture? [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following :

[15 x 3 = 45]

- Explain the working principle of Acoustic Wave based Temperature sensor used in temperature measurement. [8]
 - Explain the working principle of Humidity type sensors used in IoT applications. [7]
- Explain the advantages of using silicon technology in smart sensors. [10]
 - How do interface circuits affect the performance of smart sensors? [5]
- Discuss the role of AI in enhancing the performance of smart sensors. [8]
 - Predict the future impact of smart sensor technologies on consumer electronics. [7]
- What is an equivalent circuit of a sensor, and why is it important in sensor design? [8]
 - Describe impedance spectroscopy and its significance in sensor modeling. [7]
- What are the different types of toxic gas present in the coal mines? [5]
 - What types of sensors used to detect those? [5]
 - How toxic gas is detected by using sensor in the coal mines. [5]

*** END OF PAPER ***



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PECAIDS701B/PECAIML701B Computer Vision

UPID : 007800

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following :

[1 x 10 = 10]

- (I) True or False: Morphological operations, such as erosion and dilation, are primarily used for sharpening image details.
- (II) True or False: Feature extraction is the process of reducing the dimensionality of data while preserving relevant information.
- (III) True or False: K-means is based on minimizing the sum of squared distances within clusters.
- (IV) True or False: Biometrics can include the analysis of physiological traits like fingerprints and iris patterns.
- (V) What is the primary goal of edge detection in image processing?
- (VI) True or False: Edge detection is the process of identifying boundaries or sharp transitions in an image.
- (VII) True or False: In morphological operations, structuring elements are used to define the neighbourhood of each pixel in the image.
- (VIII) True or False: The cosine similarity can be used to measure the similarity between documents in natural language processing.
- (IX) True or False: KNN is a non-parametric algorithm because it doesn't make assumptions about the underlying data distribution.
- (X) True or False: In edge detection, the result is a binary image with edges highlighted in black and white.
- (XI) True or False: The LoG operator combines Gaussian smoothing and second-order derivative operations.
- (XII) True or False: The Sobel operator performs Gaussian smoothing as a preprocessing step.

Group-B (Short Answer Type Question)

Answer *any three* of the following :

[5 x 3 = 15]

2. You have an 8-bit grayscale image, and you want to compute its histogram. The image has the following pixel values: 100, 120, 130, 140, 120, 130, 130, 140, 150, 150, 160. Calculate the histogram for this image, showing the frequency of each pixel value. [5]
3. How does FLDA differ from Principal Component Analysis (PCA)? [5]
4. How is the Prewitt operator similar to the Sobel operator in edge detection? [5]
5. Explain K-Medoids clustering technique. [5]
6. Provide examples of real-world applications where PCA is commonly used for data analysis or feature reduction. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following :

[15 x 3 = 45]

7. (a) What is object detection in computer vision, and how does it differ from image classification and semantic segmentation? [5]
- (b) Explain the concept of multimodal biometrics and how combining multiple biometric modalities can enhance recognition accuracy and security. [5]
- (c) Describe a real-world application of activity recognition, such as human action recognition, and discuss its significance in fields like healthcare or security. [5]
8. (a) In image enhancement, what role does contrast stretching play, and how does it improve image quality? [6]
- (b) Give examples of common pre-processing techniques used to enhance image quality. [4]
- (c) How is thresholding used in binary image analysis, and what are some common methods for selecting appropriate threshold values? [5]
9. (a) What is the fundamental idea behind the K-nearest neighbors (KNN) algorithm? [3]

- (b) How does the choice of the value of K affect the performance of the KNN algorithm? [3]
- (c) What are the distance metrics commonly used in KNN, and how do they impact the algorithm's performance? [6]
- (d) What is the curse of dimensionality, and how does it affect the KNN algorithm? [3]
10. (a) Define semi-supervised learning in the context of computer vision and discuss its advantages compared to supervised and unsupervised learning. [3]
- (b) What is the role of labeled and unlabeled data in semi-supervised learning, and how do they contribute to model training? [3]
- (c) What are some real-world scenarios where semi-supervised learning is particularly useful in computer vision applications? [3]
- (d) Discuss the trade-offs and challenges associated with semi-supervised learning, and how they impact its effectiveness in computer vision tasks. [3]
- (e) Explain the concept of clustering in unsupervised learning and provide an example of its application in computer vision. [3]
11. (a) Suppose you have a dataset with one-dimensional data points and you want to model it using a GMM with two components. You are given the following data points:
Data Points: [1.5, 2.0, 3.0, 3.5, 5.0, 5.5, 7.0, 7.5]
You decide to initialize the GMM with two components as follows:
Component 1:
- Mean (μ_1): 2.0
- Standard Deviation (σ_1): 1.0
- Weight (π_1): 0.6
Component 2:
- Mean (μ_2): 6.0
- Standard Deviation (σ_2): 1.0
- Weight (π_2): 0.4
Calculate the posterior probabilities of 1st data point belonging to each of the two components after one iteration of the Expectation-Maximization (EM) algorithm. [8]
- (b) You have a dataset of one-dimensional data points with two components, and you want to model it using a Gaussian Mixture Model (GMM) with two components. You decide to apply the Expectation-Maximization (EM) algorithm to estimate the parameters of the GMM. You start with an initial guess for the model's parameters.
Initial Parameters:
Component 1:
- Mean (μ_1): 2.0
- Standard Deviation (σ_1): 1.0
- Weight (π_1): 0.6
Component 2:
- Mean (μ_2): 6.0
- Standard Deviation (σ_2): 1.0
- Weight (π_2): 0.4
Your goal is to perform one iteration of the EM algorithm to update the parameters of the GMM based on the given dataset.
1. Perform the Expectation step (E-step) to calculate the responsibilities (posterior probabilities) of each data point belonging to each component.
2. Perform the Maximization step (M-step) to update the parameters of the GMM based on the responsibilities.
Calculate the updated values of the parameters (μ , σ , and π) for both components after one iteration of the EM algorithm. [7]

*** END OF PAPER ***



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PECAIDS702A/PECAIML702A/PECICB701C Ecommerce and ERP

UPID : 007801

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following :

[1 x 10 = 10]

- (I) Write one importance of cyber law.
- (II) What does E-Commerce represent?
- (III) What is the Full form of C2B and C2C?
- (IV) Mention 1 strategy to improve your E-Commerce revenue.
- (V) What are the 4 C's in E-Commerce.
- (VI) What is supply chain management.
- (VII) What is e-cheque?
- (VIII) What is tele marketing.
- (IX) Give one example of Home-shopping.
- (X) What are the disadvantages of E-Commerce.
- (XI) What is full form of WAP?
- (XII) State the key element of a business model used in E-Commerce.

Group-B (Short Answer Type Question)

Answer *any three* of the following :

[5 x 3 = 15]

2. What is a cyber crime? What are the different measures to prevent cyber crime? [5]
3. What are the challenges in supply chain management? [5]
4. Discuss about secure Electronic transaction. [5]
5. Discuss about a call center with respect to tasks handled, mode of operation and equipment required. [5]
6. Discuss about electronic funds transfer. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following :

[15 x 3 = 45]

7. (a) What are the steps involved during transaction flow in e cash system. [8]
(b) Discuss about the risks involved in electronic payment system. [7]
8. (a) Define E-Commerce. [5]
(b) Describe some of the advantages and limitations of E-Commerce. [5]
(c) What are the rules and regulations for controlling E-Commerce. [5]
9. (a) Define WAP. Explain its importance in E-Commerce. [2+3]
(b) What are handheld devices [5]
(c) Discuss about infrastructure requirement for E-Commerce [5]
10. (a) Discuss about a firewall with respect to its benefits. [5]
(b) What are the functions of the firewall with respect to E-Commerce? [5]
(c) What are the different categories of a firewall? [5]
11. (a) What is EDI? [5]
(b) Discuss its layered structure. [5]
(c) Describe about EDI agreement. [5]

*** END OF PAPER ***